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SOCIETY OF ARTS.

FRIDAY, MAY 13th, 1853.

TWENTIETH ORDINARY MEETING,

Wednesday, May 11th, 1853.

The Twentieth Ordinary Meeting of the Society was held on Wednesday, the 11th instant, Henry Cole, Esq., C.B., in the chair.

The following were elected Members :

Elliott, Rev. William, Harewood-street, Dorset-square.
Johnson, John Henry, 47, Lincoln's-inn-fields.
Joynt, William Lane, Limerick.
Wilson, Alderman Richard, Bramley, near Leeds.

A paper was read on the " Application of the Microscope to Photography," by the Rev. W. Towler Kingsley. The author commenced by a brief account of the laws of refraction, the nature of the prismatic spectrum, and the separation of a ray of light into the heating, light-giving, and chemical rays ; he then said—

I shall now proceed to state what is the nature of the change produced by the action of light on silver salts. We may easily conceive that the molecules of the simple substances of which a compound body is formed are capable of different periods of vibration, like two strings of different note ; and hence, if the vibrations of the luminiferous ether are taken up by one substance and not by the other, and the chemical affinity of the one for the other is at the same time feeble, chemical decomposition would ensue. This, at any rate, seems to be a reasonable view of the case. The salts of silver are very easily decomposed, and there is always a tendency in them to allow the silver to return to the metallic state. For instance, the oxide of silver is reduced to the metal by heat with great ease, or by placing it in contact with any substance that has a considerable affinity for oxygen. This action, however, is much more rapid if the process be carried on in strong sunshine. The iodide of silver follows the same law ; but bromine and chlorine have a greater affinity for silver than iodine ; and if we expose iodide of silver to the action of bromine or chlorine, or of both in order, we shall disturb the feeble affinity of the iodine for the silver, and render the compound so unstable that the action of light is quite able to reduce the metal ; and if we stop short before we reach this point, it is still possible to carry on the further reduction of the metal by the use of substances which have a slightly greater affinity for the iodine than the silver has in its now altered condition. This process constitutes the whole practice of photography ; for though other metals than silver can be used for the purpose, it is the cheapest as yet known that possesses the property of returning to its simple form with sufficient ease for the purpose.

The process of Daguerre, as now practised, is to expose a polished and clean silver plate to the action of the vapour of iodine, and then, for a very short time, to that of bromine, and then a second time to that of iodine. This treatment coats the plate with iodide of silver, and then liberates a portion of the iodine, bromine taking its place. The image of the object to be delineated is now formed upon the plate, and then the plate is exposed in the dark to the action of the fumes of mercury, which in a short time whiten the parts that the light has acted on. It used to be thought that the image was formed by particles of mercury being deposited upon the surface of the silver. This, however, I am sure, is quite a mistake ; and though I am unable to explain the whole action that takes place, I have no doubt of the nature of it. The vapour of mercury has a decided affinity for oxygen, iodine, bromine, and chlorine ; when, therefore, the plate is exposed to it, the vapour deprives the iodide of silver of its iodine, and deposits pure silver. When bromine and chlorine are also present, silver is reduced, and at the same time salts of mercury are formed ; and I have no doubt that the different colours of the lights, according to the different proportions of iodine, bromine, &c., are due to these salts of mercury ; but as the quantity is very minute, it is a matter of great difficulty to detect them,—calomel and the black oxide I have detected. After the plate has been acted upon by the mercury, it is fixed by first removing the unreduced iodide by a bath of hypo-sulphite of soda, and then by gilding it slightly with hypo-sulphite of gold. If the action of the light be too strong, metallic silver is formed at once, and then the mercury unites with it, and forms an amalgam that is not as light in colour as the silver reduced in the first instance. This seems to be one of the points where there is hope of gaining by further experiments ; for if some way of reviving the silver on those parts of the plate where the light has not actually reduced the silver can be discovered, without destroying the revived parts, we should be able to make sure of every plate by merely giving time enough to the exposure to the light. I may mention that the vapour of aldehyde gives promise of effecting this object. As a deoxidizing or deiodizing agent, it is most powerful, but the difficulty is to restrain its action. For the microscope, Daguerreotype plates prepared in the usual manner are quite capable of receiving an impression in about a minute's exposure. These impressions, however beautiful, will never be as useful as those taken on glass or paper, and which admit of being copied photographically.

The most simple process is that known under the name of the Collodion Process, introduced by Mr. Scott Archer.

It is not worth while to describe the method of making collodion, as it can be bought ready-made as cheap as it can be made. With it a very small quantity of iodide of silver, dissolved in iodide of potassium or in cyanide of potassium, is mixed. This is now to be poured on a plate of glass, and the excess poured off again, so as to leave a film of the preparation on the glass surface. The plate is now to be plunged into a bath of nitrate of silver, 30 grains to the ounce of water ; and as soon as the whole of the plate will retain the water without running into streaks, the plate is to be exposed to the action of the light ; then it is to be plunged into a bath of pyrogallic acid, 3 grains ; water, 1 ounce ; glacial acetic acid, 1 drachm. This deiodizing and deoxidizing bath developes the image ; the unreduced iodide is then to be removed by hypo-sulphite of soda. This is the ordinary process, and the method is simple and good. If we add to the collodion mixture a small quantity of iodide or bromide of iron, and develope with protonitrate of iron, the process is rendered much more energetic; for we obtain on the plate, as soon as it goes into the silver bath, nitrate of iron, which deiodizes the plate as soon as the light strikes it. I do not find these preparations of iron to keep well, and therefore the preparation should be made only a short time before it is to be used. Iodide and bromide of arsenic are also admirable accelerators, and appear to keep for months without change; with them either the pyrogallic solution or protonitrate of iron may be used. I do not think that the collodion process will be as good as the paper processes, because it is a very difficult matter to coat large glass plates; and after they are finished, they take up a great deal of space; also, they are more troublesome to take positives from.

I may here mention that albumen, treated exactly the same as the collodion, only dried and heated after being poured on the glass, acts just as well and as quickly.

I shall now describe the method of preparing the paper I use. I have no doubt that many others are just as good.

I prefer Canson's paper, and use it either waxed or not, with nearly the same results; but the waxed paper is the more easily managed, on account of its not becoming so tender from soaking. The paper is first to be soaked for some hours in a bath composed as below:

Distilled water, 1 pint;
Iodide of potassium, half-an-ounce;
Bromide of potassium, half-a-drachm;
Fluoride of potassium, 1 drachm;
The whites of two eggs.

If this is done under the air-pump so much the better. The paper is now to be hung up to dry, sheet by sheet; and so prepared, it keeps well, certainly for months. If arsenic be added, as in the collodion, the paper is more sensitive. When it is to be used, it is to be plunged into a bath composed as follows:

Nitrate of silver, 30 grains;
Acetic acid, half-a-drachm;
Distilled water, 1 ounce.

After the paper has become saturated in this bath, it is to be placed on a sheet of pure blotting-paper, and that on a sheet of glass on which it will adhere from the superabundant fluid; it is now to be exposed to the action of the light for the required time, which of course depends upon the intensity of the light; with my microscope, from two to five minutes is quite enough. It is then to be developed in a bath of saturated gallic acid; if the image does not seem dark enough in an hour, a few drops of the silver bath should be added. Hyposulphite of soda as usual is the fixing agent. The silver may be used over and over again, if it be filtered with animal charcoal after each time it is used, or as soon as it shows the least sign of becoming discoloured.

In these processes we have the affinity for the iodine disturbed by the action of the light; the developing agent carries this further, and the oxygen of the air or water or acid, which has always a slightly greater affinity than iodine for silver, combines with the liberated silver and produces the dark parts of the impression; if the action is carried still further we get the silver revived: and in the collodion process this produces a positive. To obtain these collodion positives, the quantity of silver in the collodion should be small, and the exposure only for an instant; after the plate is developed and fixed it should be put into a bath containing either aldehyde or grape sugar, which will revive the silver with great brilliancy. The paper pictures may be developed by placing them in the mercury box, but it is not a good way of doing it. There is one use of the collodion which is of service. In the use of very high powers with very delicate objects it is not easy to see the image formed on the vesculine screen as described hereafter. When therefore an approximate focal distance has been obtained, a collodion positive on a small scale of a portion of the image can be taken in a few moments, and so the correctness of the arrangements tried before placing the paper in its place.

I shall now proceed to describe the instrument I use. Sunlight is of course far superior to any artificial light, when we can obtain it; but as the sun will not shine whenever we choose, it is of the greatest importance to construct the instrument for artificial light, and then modify it so as to be applicable to sunlight. The light I use is the common oxyhydrogen light; magnesia or quartz may be substituted for lime ball with advantage.

The optical parts of the instrument divide themselves into four groups. The light collecting, the condensing, the objective and magnifying lenses. The first group for collecting the light consists of three lenses; the first a meniscus of about three inches focal length and two and a half diameter, the second plano-convex, and the third a double convex with the radii of the surfaces one and six. The focal lengths of these two lenses being respectively six and eight inches.

The second group, or condensing lenses, is a similar one turned the other way and on reduced scales to suit the different object glasses; between these two systems there is a plano-convex placed at its focal length from the focus of the collectors, so as to allow the rays to pass parallel to the condenser. This lens and the condensers must be changed with the object-glasses; for it must be borne in mind that we have to arrange the instrument so as to make the image of the lime ball just cover the paper to be acted upon; and so if we diminish the focal lengths of the condensers at the same time that we increase the magnifying power of the instrument, we shall have just as great an amount of light with the highest as with the lowest powers.

The next group of lenses are those of the object-glass, which requires to be very much under corrected for visible colour, leaving strong red fringes. A very simple way of making the object-glasses of an ordinary good microscope do for photographic purposes is to have a new front lens made for them; so that they can be used for either the ordinary or the photographic microscope. At this point of the arrangement we have a very good form of the oxy-hydrogen microscope; but it is a bad one for photography, as we cannot have the screen on which the image is to be formed, so near, as to enable us to use the slow motions of the various arrangements at the time we are looking at the image, except for very low powers.

We now come to the last group which occupies the place of the eye-piece of the ordinary compound microscope. This group is a form of the Ramsden or positive eye-piece, which ordinarily consists of two plano-convex lenses,placed at two-thirds their focal length, which is the same in both, and with their plane sides out. This eye-piece is not achromatic, being under corrected. The addition of a plano-concave flint lens to a double convex crown, is used by me in the place of the lens next the object. This enables me, by a slight change of distance, to make the correction perfect.

I have now only to describe the best way of using this instrument; and here, it must be remembered, that all depends upon the object-glass being good; it is very easy to get one of small angle that will give very short outlines of objects, but we must not be content with such images as these; we must get object-glasses of large angular aperture, made perfect for this purpose, so as to show well the structure of objects, as well as their outlines. This is quite feasible. Suppose, then, that we have got a perfect instrument.

At the place of the focus of the object-glass place a screen of æsculine, and a dark blue glass between the collectors and condensers; we shall now, "thanks to Professor Stokes," see the chemical image; and the correction for spherical aberration must now be made in the ordinary manner. Now put in the eye-glass or magnifier, and the æsculine at the screen, and adjust the focus. This focus will be found even in the case of chemically corrected lenses, beyond the visible; but in the case of the ordinary best object-glasses, the difference is enormous; for instance, in the case of a very fine one-fifth in my possession, if I form an image at one-foot from the eye-glass, I find the chemical image ten feet further back; of course such a lens is of *no* use for photography.

The æsculine also enables one to see at once when the light on the screen is the most intense for chemical action.

In conclusion, I have to state that one of the specimens sent was taken upon a disc of five feet diameter, which was illuminated equally, and therefore anything may be taken on that scale on paper with artificial light, and I dare say on a very much larger scale still. I look upon it, therefore, that we must give our chief attention to the corrections of the lenses, as all the other parts of the process seem to require little further than mere care in the use of common formula. I have also to add, that the focal length of the condenser being selected, in order to give the image of the incandescent spot of lime on the right scale, its angular aperture should be a shade less than that of the object-glass.

Also, if a spot of tin-foil be placed on the condenser, we can get the object bright on a dark ground; and if an opaque object be placed in the focus of the collecting lenses, and the object-glass and eye-piece be turned round to the front of the object, a very good image may be got with low power.

Mr. Foster, as an amateur in photography, wished to express his high sense of the importance of Mr. Kingsley's experiments, especially with regard to lenses, in respect to which they were far from having arrived at perfection. The data, however, furnished by Mr. Kingsley's experiments would, he trusted, lead to results more satisfactory than had hitherto been gained.

A Gentleman, referring to some of the experiments Mr. Kingsley had just shown, asked if there were anything peculiar in his mode of bringing out the Daguerrean image?

Mr. Kingsley said he had merely performed the experiment in question for the purpose of showing that the development of the image on a Daguerreotype plate did not depend, as some supposed, on the precipitation of mercury on its face. The agent he had used for that purpose was merely a solution of common pyro-gallic acid.

The Chairman said, that as by means of the microscope beauties were discovered which were not seen before, he wished to ask Mr. Bowerbank to what extent these magnified images might be again magnified, and what advantages might be obtained by the process?

Mr. Bowerbank said, no good was to be gained by magnifying any object beyond the point of obtaining a good definition. Referring to one of the specimens exhibited, he remarked that it was even too large to be of service for the purposes of physiological science; whereas, had it been taken by a low-power glass, with considerable penetration, instead of by a high-power glass with a large angle of aperture, he thought Mr. Kingsley would agree with him that it would have been better. With the greater number of microscopic objects, increase of size was not so much to be desired as extreme penetration. He was glad to see the progress which Mr. Kingsley and some other gentlemen were making in this department of the photographic art. In the last number of the *Microscopic Journal*, he understood there were one or two figures given, showing not only the possibility but the probability that periodicals would be illustrated in this manner, and thus much greater accuracy obtained than could be arrived at by means of the pencil. He hoped the time was coming, when photographic pictures in journals would be as common as those by the *camera lucida*.

Mr. Varley confirmed the observations of Mr. Bowerbank.

Mr. Samuel Highley, Jun., said, that the value of the application of photography to the microscope could not as yet be sufficiently estimated; but undoubtedly it would perform a very important part in the advance of the science of miscroscopy, for not only were we enabled to multiply and distribute delineations of scarce objects, and thereby elicit the opinions of other observers, but in many instances where there was diversity of opinion and contradictory statements regarding minute structure, it would aid others in forming an opinion as to what had really been seen; as a faithful representation of what existed in the field of the microscope was insured to us, entirely free from the suspicion of having been delineated by a hand biassed by pre-conceived ideas. With the permission of the meeting he would read a letter which he had that day received from Mr. Fox Talbot, as it conveyed information as to the first employment of sensitive media for securing delineations of magnified objects.

Lacock Abbey, May 10th, 1853.

Dear Sir,—I have great pleasure in replying to your question. The first person who applied photography to the solar microscope was undoubtedly Mr. Wedgwood, as appears by his paper in the journal of the Royal Institution for 1802; but none of his delineations have been preserved, and I believe that no particulars are known. Next in order of time to Mr. Wedgwood's, came my own experiments. Having published my first photographic process in January, 1839, I immediately applied it to the solar microscope, and in the course of that year made a great many microscopic photographs, which I gave away to Sir John Herschell, Sir Walter Calverley Trevelyan, and other friends. The size of these pictures was generally that of a half sheet of writing paper, or about eight inches square. The process employed was my original process, termed by me at first "Photogenic drawing,"—for the calotype process was not yet invented. I succeeded in my attempts, chiefly in consequence of a careful arrangement of the solar microscope, by which I was enabled to obtain a very luminous image, and to maintain it steadily on the paper during five or ten minutes, the time requisite. From the negative, positives were made freely, in the usual way. The magnifying power obtained was determined by direct measurement of the image and the object itself, which gave for result a magnifying power of seventeen times in linear dimensions, and consequently of 289 in surface. The definition of the image was good. After the invention of the calotype process, it became of course a comparatively easy matter to obtain these images; and I then ceased to occupy myself with this branch of photography, in order to direct my whole attention to the improvement of the views taken with the camera.

I remain, dear Sir, yours very truly,
H. F. Talbot.

Mr. Samuel Highley, jun.

In a letter to the Editor of the *Athenæum*, which appeared in that Journal last summer, Mr. Dallas again drew attention to the application of photography to the microscope, and stated that he had obtained very favourable results; but he did not give the details of the means employed. In the autumn of last year, whilst in Edinburgh, he (Mr. Highley) had an opportunity of seeing some of these views, but they were wanting in definition. In October, 1852, Mr. J. Delves introduced to the notice of the Microscopical Society, some very beautiful Collodion positive and negative pictures, in which the definition was extremely sharp. This Mr. Delves attained by removing the eye-piece of the microscope, and inserting that end of the body into a dark chamber or camera, twenty-four inches in length; beyond this point the image was not sufficiently defined; the object was placed on the stage, the direct rays of the sun received on the mirror, and reflected in the direction of the axis of the microscope; the object was then focussed on the ground glass of the camera, the sensitive collodionised plate replaced the focussing glass, and an image was obtained in from ten to sixty seconds. As the chemical and visual foci did not coincide in microscopic object-glasses, in consequence of their being *over-corrected*, allowance for this was necessary, and was effected by bringing the lens nearer to the plate by aid of the fine adjustment. The amount of correction varied with every object-glass, and must be ascertained by direct experiments; but whilst the lower powers required a considerable amount of correction, the higher needed but a slight, if any alteration. Mr. Highley then introduced to the notice of the Society a microscopic camera, founded on the arrangement of Mr. Delves, but presenting the advantages of compactness, and being always arranged for immediate use; whilst to those photographers who were not already possessed of a microscope, it would be found an economical arrangement. It consisted of a tube which screwed into the flange of a photographic lens, and carried the object-glasses. Over this fitted another tube, and by the sliding movement formed the coarse adjustment. This outer tube carried the stage and its fine adjustment on its upper side. To its under surface was attached a smaller tube, to which the mirror fitted, and which likewise carried the fittings for the polarizing prisms. Behind the object-glass was a fitting for the analyzer. Mr. Highley was of opinion that in many instances where the object was of a nature that depolarized light, advantage might be taken of this property to bring them up to *actinic* tints by the employment of polarized light and Darker's Selenite Stage; for whilst by this means the object would be of a colour that would produce the greatest amount of chemical effect, the plates of selenite being *minus* the thickness and refracting power of the object, would produce a background several tints less intense in colour and in actinic action. He referred to a diagram representing the various colours exhibited by a plate of selenite of varying thickness when viewed by polarized light, and likewise to the object itself in a polaroscope; also to another diagram representing crystals brought up to a deep blue by aid of selenite plates, the ground being of a greenish tint; and to the objects themselves arranged under polarizing microscopes. By such an application we should likewise probably be enabled to obtain representations of the internal structure and directions of tension in crystalline bodies. In reference to the asserted necessity for complete steadiness, Mr. Highley stated that Mr. Shadbolt had taken a great many views by the camphine light, in London, without any special arrangement for securing greater steadiness than was usually obtained in houses in London.

Mr. Kingsley said that this was done with low powers; whereas the specimens which he had exhibited were taken with higher powers. He wished to show that the very highest powers of the microscope might be used, and that the light could be obtained for the highest magnifying powers they had. He had taken one as high as fifty thousand diameters; the time required being about ten minutes.

Mr. Bowerbank handed to the Chairman a photograph of a *Navicula angulata*, taken by Mr. Delves with a one-twelfth object glass.

The Chairman proposed a vote of thanks to the Rev. Mr. Kingsley, which was carried unanimously.

It was announced that at the next meeting, on May 18th, a paper would be read, by A. G. Findlay, Esq., F.R.G.S., "On the Proposed Central American Canal, and its Relations to Commerce."

HOW TO OBTAIN PATENTS FOR INVENTIONS.

In the last Number of the *Mining Journal*, Mr. F. W. Campin gives the following statement of the course of proceeding required by the law in order to patent an invention, premising that this Act is not all that could be wished, and that it does not embrace a new patent code—that is, it does not contain the whole of the Patent Law, and therefore the ancient laws must still be referred to by those who wish to have a comprehensive view of the matter.

1. *The Application.*—This is required, by the sixth section of the Act, to be made by filing, at the office of the Commissioners of Patents, a petition, a declaration (attested by a Master in Chancery or Justice of the

Peace), and a provisional specification. The two first of these are forms of a particular size, &c., already in public circulation, which require merely to be filled in with the name and address of the intending patentee, and the *title* of the invention. The construction of a proper title, however, is a matter of much importance, since the object of the invention must be truly, though it may be concisely, indicated by it; and a bad title has overthrown numbers of patents in courts of law; and incomprehensive titles have frequently obliged patentees to take out several patents where one should have sufficed. The *provisional specification*, however, is the substantial document, as the Act expressly requires that it shall describe "the *nature* of the invention"—that is, it must set forth what the invention really does consist in, not of necessity by a detailed account of parts, proportions, &c., with drawings, if requisite, as in the complete specification, but only such a description as shall set out the *distinctive character* of the invention; and by sections 7 and 8, this must be done in such a manner as to satisfy the law-officer to whom the application is to be referred; although the approval of the law-officer will not make this document good if it should not be found to comply, in all respects, with the terms of the Act; and should this document be couched in very restrictive terms, the patentee may find himself shut out from including in his patent, by his complete specification, those practical improvements in details, which may be of vital importance to the success of the invention. These documents having been prepared, the petition (if not already stamped) must be stamped with a proper *five pounds stamp*, and presented at the Commissioner's office, where the day of its delivery will be recorded, and priority secured from that day, unless it be otherwise specially ordered by the proper officers.

By section 9, the applicant may deposit his complete specification instead of the provisional specification; but as this at once concludes him, as to practical details and everything else, and requires the payment of the *five pounds* stamp duty on that document, as well as the five pounds on the petition, it is seldom adopted.

The application having been filed and passed by the law-officer, is then advertised in the *London Gazette*, as protected for six months, during which time the invention may be *used* and *published* without invalidating the patent.

2. *Proceeding to Complete the Patent.*—After the application is passed, the patentee may proceed as quickly as he pleases to complete his patent, which is done by the agent giving *notice* to *proceed* at the Commissioner's, and upon payment of *five pounds*. This notice is then gazetted, and any one is invited to oppose within twenty-one days from the date of the *Gazette*. This stage *must* be taken at four months from the date of the application, otherwise the obtaining of the patent within the six months' protection (which is required by the Act) will be attended with great risk of losing the patent.

When this has been gone through without opposition, the patentee may apply for his warrant, which is done by paying *five pounds*, and then to seal and complete the patent by paying another *five pounds*. This must be done some days within the term of three months from the date of the warrant (*vide* section 19).

3. *The Specification* (otherwise, *The Complete Specification*).—The patent so obtained will be found to contain (unless a complete specification has been deposited on application) a proviso, obliging the patentee to file in the Commissioner's office an instrument in writing, which shall particularly describe and ascertain the nature of his said invention, and in what manner the same is to be performed, to be filed within six calendar months next and immediately after the date of the letters patent, and the date of the patent (unless in an extraordinary case) will be found the same as the day of the *application*; so that, if the completing of the patent be put off till the last moment, the specification will have to be prepared at the same time therewith.

The specification is no new document, and its importance to the inventor, as a document setting forth his claim in regard to the patented invention, and to the public as the record teaching them the improved art invented by the patentee, is pretty well understood. Nevertheless, it is never out of place to remind patentees that the law strictly requires of this document, that it shall define with legal certainty and exactitude nothing more or less than a new and useful invention, and the very best way of carrying out the same, in all its details (with drawings, if necessary), as known to the patentee. It must also be consistent with the provisional specification; in reality, it should be simply a further development of that document. Indeed, skill and experience in preparing these documents are eminently necessary to render them reliable. The specification and drawings must be on parchment of a peculiar size, &c., and stamped with a proper 5*l.* stamp.

The stamp duties mentioned are required to be paid by the Act just passed, levying the Government patent dues by stamps.

To keep a patent in force, further stamp duties, of 50*l.* at the third year, and 100*l.* at the seventh year must be paid. There are other points of importance in the new law, but they do not refer to the ordinary routine of passing letters patent.

SELF-SUPPORTING ELEMENTARY SCHOOLS OF ART.

The following communication has been received from the Dean of Hereford, and will be found useful as illustrating the working of the new system. It should be borne in mind that in this instance the premises are rent free.

Deanery, Hereford, 19th April, 1853.

MY DEAR SIR,—Our elementary drawing-school, in connection with the Board of Practical Art at Marlborough House, has now been open for more than two months, and promises so well that I think I ought to give you some account of it.

The room, a very large and fit one, where the classes meet, has been admirably fitted up for the purpose, under the direction of the Master and the Committee, at an expense of between 30*l.* and 40*l.*, which, with the models and examples we have had from your Board at half price, amounts to nearly 70*l.* Of this sum rather more than 40*l.* has been raised by subscription, the rest paid out of the class fees.

There are two classes, one a day class, consisting of the upper classes, in the town and neighbourhood, meeting twice a week in the morning, for a lesson of two hours. In this class there are 48 pupils, paying 2*s.* per week.

The other a night class, consisting of the mechanics and artizans of the place, meeting twice a week in the evenings also for two hours each. In this class there are 51 pupils, paying 6*d.* per week.

There are also four schools in which the master attends to give instruction once a week; three of them being schools for the poor, pay 5*l.* per annum. One, the Cathedral School, paying 10*l.* per annum to the master, who receives the whole of what the schools pay, but only one-half of what is paid by the classes, the other half being paid to the Committee to meet the current expenses.

Our accounts have just been balanced for the last two months. The amount of payments by the classes for that time is 47*l.* 6*s.*, one half of which, 23*l.* 13*s.* has been paid to the master. This, supposing the payments to continue on an average what they have been—and there is every probability that they will do so—would give from this source, supposing the school to be at work forty-four weeks in the year, a salary of 129*l.* 15*s.* 6*d.*, to which add the schools, and this will make the master's salary 154*l.* 15*s.* 6*d.*

I have very often visited the classes while at work, and have been very much struck with the great interest which they all seem to take in it. The evening class of artizans and mechanics I have been particularly struck with, and I do not know when I have seen a more interesting sight than this class earnestly at work, with their room well-lighted up, every one apparently bent on deriving all the benefit he can from the instruction given.

These schools promise to be a real blessing to the town, not only from the useful instruction they are giving, but also from the opportunity which it affords to those who attend the evening classes of spending their evenings in the way many of them are now doing, and so different from what has hitherto been the case.

The instruction is popular with all classes, and I have no doubt, now we are started, it will be in every way self-supporting.

Had your Board made us an offer of 200*l.* per annum, (which is about the sum it will take to carry on these schools well), on condition that instruction should be gratis, I believe it would have been a complete failure. I cannot but look upon this experiment as a happy illustration of the self-supporting principle, which ought, more or less, to characterize all education.

The population of Hereford is under 13,000, the trades in it entirely those connected with agriculture—we have no manufactures whatever—this makes the success of these schools the more striking. One does not wonder at success in such a town as the neighbouring one of Worcester, with the large porcelain manufactures; at all events, this, I think, will be a safe conclusion for you to draw, that when the population of a town is sufficiently large to require a school of this kind, that the instruction they offer is so useful, and so much in request, that when well directed, they may at once become self-supporting; and that they ought not to look to the Board of Practical Art for help, beyond that of having models and examples at the prices you are now allowing us to have them.

We have an admirable Honorary Secretary, who tells me he has no doubt whatever of the continued prosperity of these schools. The Mayor of Hereford is Chairman of our Committee of Management, and takes great interest in it.

Believe me, my dear Sir, very sincerely yours,
(Signed) Richard Dawes.

Henry Cole, Esq.,
Department of Practical Art,
Marlborough House.

An intermediate evening class, paying 1*s.* per week, is contemplated on the alternate evening with the other.

SELF-SUPPORTING ELEMENTARY DRAWING AND MODELLING SCHOOLS, AT HEREFORD.

TREASURER'S ACCOUNT at April 12th, 1853.

Dr.	£	*s.*	*d.*	£	*s.*	*d.*
Subscriptions in aid of outfit, received up to present time				43	11	0
1st Month:—						
Forty-eight pupils at 2*s.* per week, 4 weeks	19	4	0			
Fifty-one pupils at 6*d.* per week, 4 weeks	5	2	0			
2nd Month:—						
*Forty-six pupils at 2*s.* per week, 4 weeks	18	8	0			
Forty-six pupils at 6*d.* per week, 4 weeks	4	12	0			
				47	6	0
				90	17	0
Subscriptions promised (not yet paid)				5	8	6
				96	5	6

* Of Class A, two pupils in arrear, deduct therefore 16*s.* from 47*l.* 6*s.*, leaves 46*l.* 10*s.*, half of which—namely, 23*l.* 5*s.*, paid to Mr. Clifton, the remainder will be paid at next quarter.

Cr.	£	*s.*	*d.*
Payments made for the School by the Very Rev. the Dean of Hereford, including carriage, &c., of casts and examples	34	7	6
Advertising, printing, &c.	6	3	5
Boards for College School (to be repaid)	2	8	0
Use of Guildhall for Preliminary Meetings	0	10	6
Williams, carpenter, alterations to room-desks, fittings, &c.	17	11	0
Watkins, for colouring and painting room	6	10	0
Postages, and sundry small expenses	2	2	6
Candles for lighting room, evening classes	1	12	11
Cleaning room and attendance	1	0	0
	72	5	10
Mr. Clifton, master, half-fees from scholars	23	13	0
	95	18	10
Balance	0	6	8
	96	5	6

There will be due, at Midsummer, a moiety of fees from the public schools, the whole of which goes to the master—namely:

	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Cathedral School	10	0	0	5	0	0	5	0	0
Scudamore School	5	0	0	2	10	0	2	10	0
Blue-coat School	5	0	0	2	10	0	2	10	0
St. Peter's (or Mr. Venn's)	5	0	0	2	10	0	2	10	0
				12	10	0	12	10	0

J. T. Owen Fowler,
Hon. Sec. and Treasurer.

PUBLIC LIBRARIES AND MUSEUMS.

An important return has recently been presented to the House of Commons, and printed by their order, showing the results which have been produced by Mr. Ewart's "Library and Museums Act" (8 and 9 Vict., c. 43). The return is incomplete, inasmuch as several important replies had not been received; but it is nevertheless a very interesting and valuable document. The kind of information which Mr. Ewart desired to obtain is best shown in the title of the return itself, which is as follows:

"Returns showing in what Boroughs in England and Wales Libraries and Museums have been formed, under the Act (8 and 9 Vict. c. 43), 'For encouraging the Establishment of Museums in large Towns,' and under the Act (13 & 14 Vict. c. 65), 'For enabling Town Councils to establish Public Libraries and Museums;' with the Date of their Establishment; the sum subscribed (if any) to promote such Establishment; the Number of Votes Polled for and against the Introduction of the Act; the Number of Readers and Visitors admitted Monthly since the Establishment of such Libraries and Museums; the Number of Volumes contained in each Library; the Number of Volumes issued Monthly to Readers in the Library; the Number of Volumes issued to Readers out of the Library (in cases where there is a Lending Library); the Number or Amount (in Books, Specimens of Natural History, Works of Art, or other Objects, or in Money) of Donations or Bequests to such Libraries or Museums; the Annual Cost of maintaining such Libraries or Museums; and the Amount of the Borough Rate appropriated thereto:"

"And showing in what Boroughs such Libraries and Museums are in course of Formation; with a Report of the present State and Prospects of the same."

It appears that Public Libraries and Museums have been established under the power of this Act, in Bolton, Dover, Leicester, Warrington, and Winchester. The excellent, but ill-supported Museum at Canterbury, was purchased, and made town property; and the Liverpool Museum, the Manchester Free Library, and the Sunderland Museum, though established independently of the Act, have been brought under its provisions. In Oxford a poll was taken in 1852, and the formation of a Town

Museum decided upon. In Birmingham, Exeter, and Sheffield, attempts were made to introduce the Act, but without success, the numbers voting being:

	FOR		AGAINST
Birmingham	363	..	534
Exeter	118	..	853
Sheffield	104	..	294

These numbers are very remarkable. It is certainly surprising that in such large towns so small a number of the inhabitants took the trouble of expressing their opinions on the subject, and not altogether very creditable to them that so few came forward in support of a good and useful measure. The return further shows that no attempt whatever had been made to introduce Mr. Ewart's Act into Bradford, Bristol, Derby, Devonport, Halifax, Leeds, Newcastle, Nottingham, Plymouth, Portsmouth, Salisbury, Shrewsbury, Wolverhampton, Yarmouth, York, and many other smaller places of less wealth. It is no doubt true that in many of these towns there are good private Institutions, dependent on the funds of private subscribers or chance donations; but the fact that no attempt has been made to render them independent and permanent, whilst it speaks little for the zeal and enlightened energy of the townspeople, seems to indicate great apathy in the progress of science and industrial knowledge generally.

Want of space renders it impossible to give the whole of this return; but the following extracts will serve to show the kind of replies sent, and the mode in which the Act has worked.

BOLTON.

In accordance with resolutions passed by the Town Council of this borough, a poll of the burgesses was taken on 26th day of March, 1852, under the provisions of the Act 13 & 14 Vict. c. 65, when 662 votes were recorded in favour of, and 55 votes against the adoption of the Act. At a subsequent meeting of the Council, held on the 12th May, a Committee was appointed to carry into effect the provisions of the Act; and such Committee have rented, and are now in the occupation of suitable rooms and have entered into contracts for such portions of the necessary fixtures, &c., as are now required in the Library department, to which their attention is more immediately directed.

At the time of the adoption of the Act, no funds had been subscribed for the purchase of books or works of art, and some difficulties at first presented themselves, the objects of the Institution not being sufficiently understood; it was therefore deemed advisable that a public meeting should be held, and such meeting was convened by the late mayor, and was held on 6th November last. At the meeting a committee was appointed to solicit subscriptions and donations of books and works of art. Up to the present period a sum of 2,000*l.* has been subscribed, and about 120 volumes of books have been presented. Lists of books for purchase have been partially prepared, and the most active exertions are being made for the early opening of the library to the public. The first object aimed at is the formation of a Free Lending Library, which, it is hoped, will be available to the working-classes by the commencement of the ensuing year. A Reference Library is then intended to be provided, of such extent and value as the funds subscribed will warrant. It is expected that the gross amount of subscriptions will reach 3,000*l.* The borough rate will realise about 280*l.* per annum.

The Return draws attention to the inadequate provisions of the present Libraries and Museums Act, and the restrictions imposed on the expenditure of the rate of ½*d.* in the £1. authorised to be levied. It is stated that the Library will contain a fair proportion of the general literature of the country up to the time of its formation; but that, unless some provision be made for keeping up a supply of the current literature, it will fail to meet the requirements of the population of the borough; and it is suggested that this point should be considered by Her Majesty's Government, and that such an alteration of the existing law should be made as will authorise the expenditure of any surplus moneys (after payment of the rent, salaries of officers, lighting and warming, &c,) in the purchase of books and works of art, so as to keep up the interest of the public in the institution, and make it available for supplying the wants of a large population.

The Return further solicits a donation of the works published by the Record Commissioners, and of printed public, historical, and Parliamentary Books, Reports, and Returns.

LEICESTER.

The Museum for the Borough of Leicester was established by the Town-council, in the year 1848, under the powers of the Act 8 & 9 Vict. c. 43, at which period a building was purchased at a cost, including alterations, &c., of 4,211*l.* 6*s.*, of which the sum of 2,600*l.* was borrowed on mortgage of the building. No subscriptions were received to promote its establishment; but the Leicester Literary and Philosophical Society presented the valuable contents of their Museum to the town.

It is estimated that the average monthly attendance of visitors is about 2,500, the Museum being open to the public (without charge) five days per week.

There is no Library attached to the Museum established under the Act of 13 & 14 Vict. c. 65; but it contains a small library of reference, principally presented by his Grace the Duke of Rutland and the Literary and Philosophical Society.

The number of specimens, &c. in the Museum is estimated at 11,505, which is constantly receiving accessions by donations. The contents of the Museum at present are as follows quadrupeds, 60; birds (foreign, 150; British, 335), 485 insects, British, 1,840; insects, exotic, 1,600; shells, foreign and British, recent, 1,600; shells, fossil, &c., 2,200; fossil bones, &c., and carboniferous fossils, 290; minerals, marbles, &c., corals, echinida, &c., 1,850; sculpture, casts from the antique, models and pictures, 80; manuscripts, casts, coins, botanical specimens, together with other miscellaneous articles, about 1,500;—total, 11,505.

The amount of borough-rate appropriated to the maintenance of the Museum, is ½*d.* in the pound, which amounts to the sum of 239*l.* per annum, and has hitherto scarcely sufficed to defray the annual expense of interest on mortgages (2,600*l.*), fittings, cases, porter's wages and incidental charges, exclusive of the curator's salary, (50 guineas per annum, which has been defrayed by the Literary and Philosophical Society). As, however, the rate of interest has recently been reduced, and as the annual expense of cases will not in future be so large, the position of the establishment will shortly be more favourable, and on the whole, it may be stated as prosperous; whilst, from the increased attendance of the working classes on holidays, &c, it is evidently producing a beneficial effect upon the public.

The town of Leicester possesses a very valuable collection of ancient books, principally on theology, which is kept in a room at the Town-hall, and which is open gratuitously to the public. The use of this Library, however, from the character of the works, is almost exclusively confined to the clergy and dissenting ministers.

MANCHESTER.

The Manchester Public Free Library was established by public subscription on Jan. 8th, 1851; transferred to the Town Council, under the provisions of the 13th and 14th Vic., c. 65, at a meeting of the subscribers, held Sept. 2nd, 1852; and opened for public use on the 6th of the same month.

The Library comprises two distinct collections of books; the one for use and reference within the building, the other for circulation. There is no Museum.

The sum subscribed to promote the establishment of the Library was 12,742*l.* 9*s.* Of this amount, 7,013*l.* 7*s.* 7*d.* was expended in the purchase, enlargement, repair, and furnishing of the building, and 4,296*l.* 5*s.* 1*d.* on books and binding.

The numbers of votes polled on Aug. 20th, 1852, for the introduction of the Act were, for, 3,962; against, 40: majority, 3,922.

The number of volumes at present (Feb. 12th, 1853) contained in the Library is as follows:—in the reference department, 16,619; in the lending department, 5,832: total, 22,451.

The number of volumes presented to the Library has been 4,427. Of these, about 2,530 volumes have been placed in the lending Library, and about 1,900 in the Library of reference.

The number of readers and visitors collectively, admitted in the month of September (1852), was 58,166: and from the 1st to the 22nd of October inclusive, 49,379. Up to the latter date, police officers were stationed at the doors, part of whose duty it was to count the visitors on their entrance; but on Oct. 23rd, the attendance of the police was discontinued; and since that time, no means have existed for ascertaining the number of visitors.

The number of readers between September, 1852, and January, 1853, will nearly correspond with that of the books issued in each department of the Library respectively, which is as follows:—reference department, 33,094 volumes; lending department, 37,252 volumes; total, 70,346 volumes. The Library, in these five months, having been open during 126 days, the daily issue has been, on the average, 558 volumes.

The total number of persons admitted, on the production of a guarantee from two burgesses, either of Manchester or of Salford, to the loan of books has been during the before-mentioned five months, 3,735.

EXHIBITION AT MADRAS.

THE following extracts from a Lecture delivered by Dr. Hunter, at Madras, on the 8th of February, respecting the Exhibition of Arts, Manufactures, and Raw Produce, about to be held there in March, will be read with interest:

"One of the principal objects contemplated by this Exhibition is to show to the public at one view what has been done for the arts and manufactures in India; the points in which they are defective; the attempts that have been made from time to time, both by private and public enterprise, to give a proper stimulus to artistic and industrial pursuits; and finally, the progressive improvement which has been slowly but steadily made. In a lecture of this kind I need not waste your time by going back to those periods of antiquity when India was renowned for her arts and manufactures; it is sufficient for us to allude to the fact, and to try to trace out a few of those causes which have led to their deterioration, as India was for many centuries renowned for her arts and manufactures; but these have gradually deteriorated, and other countries are now deriving the benefits of her simple inventions, which the triumphs of science and machinery have carried to such perfection that the original discovery could hardly be recognized in the complicated manipulations of the self-regulating machine. Many thinking persons are inclined to doubt whether we have derived much benefit from the substitution of machinery for manual labour. There is no question that several processes, both in artistic and industrial manufactures, are better performed by the labour of the fingers, assisted with some simple and convenient tool; but most of the efforts of modern science have been directed to the substitution of complicated self-adjusting machinery and steam-power, so scientifically applied as to save the labour of the hands, the eyes, and the minds of our operative classes; for it is now the boast of engineers that they can produce machinery which will do everything but speak. The effect of all this upon our labouring classes has been to reduce wages, to ruin particular trades, and to substitute the cheap and flimsy for the solid and substantial in our staple manufactures; while it has inundated the market with a great deal that is gaudy, meretricious, or vulgar in taste, form, and decoration. In fact, the remark may be justly made, that things are now got up for sale which were formerly made for use; the great rage in all countries for novelty and cheapness having quite thrown into the shade the better qualities of durability and fitness. I could bring forward many instances of the superiority and durability of many old manufactures, but will content myself with two which have been borrowed from the East. One of these is the manufacture of paper (first discovered in China); the other, the weaving of cotton and muslin fabrics, which at one time formed a great source of revenue to India. There are few of our modern papers which will bear the least comparison with the old hand-made papers from linen rags, which used to be manufactured in many parts of Europe during the last century. The great aim of the present day appears to be the production of white paper, without any regard to durability or chemical composition. In fact so little attention is paid to the latter quality, that there is not one of our English papers which is perfectly suited for use in warm climates, and few that will keep good for more than a season or two; the fault lies in its mode of preparation, the damp atmosphere soon causing the size or glue to decompose. This is particularly the case with drawing and writing papers; and the subject is one deserving of attention, as few of our modern prints or lithographs will keep in India.

"The greater durability of the hand-made muslins, checks, and ginghams of India, compared with the cheap machine-made chintzes and cotton fabrics of Europe, is another point of considerable moment to the manufacturing interests of both countries, as the cotton piece goods of Southern India are beginning to rise in estimation with the European community. One of the curious and unlooked-for results of the great Exhibition of 1851 was, satisfying the public that very little is known, even in India, of what the country can and does produce; and many an old Indian was surprised to find how little he knew of the products, the resources, and the industry of the natives. Another startling result which experience is proving to be correct is, that many of the Indian patterns for manufactures are designed and arranged upon better and simpler principles than those which regulate the artistic designs of Europe. I had often suspected this to be the case, and I hope to have the opportunity during the month of March of showing from some simple native designs which have been executed by the pupils in our school, that the natives excel most European artists in the tasteful arrangement of colours; and that a flowing, graceful, and clear style of outline, forms the basis of their instructions in drawing, painting, and the arrangement of architectural ornament. Some of the prizes which I am about to award to-day are for careful drawing of outline patterns, and tasteful arrangement of colours; but I shall defer my remarks on this subject till I have concluded the observations about the contemplated Exhibition. I feel satisfied that the public will be pleased when they see what India really can produce; and I think it desirable that all classes of the community should have an opportunity of knowing, seeing, and judging for themselves, what has been going on in India during the last century."

BOOKS.

RETURN to an Order of the Honourable The House of Commons, dated 25 April, 1853;—*for*,

RETURN, "from the Year 1840 inclusive, of the DUTY paid on BOOKS: 1. Being of Editions printed to the Year 1801, Bound or Unbound; 2. Being of Editions printed in or since the Year 1801, Bound or Unbound; 3. In the Foreign Living Languages, being of Editions printed in or since the Year 1801, Bound or Unbound; distinguishing the Years, and the Rates of Duty."

	BOOKS, the Duties on which are regulated by the Date of their Publication, viz.:—Books, other than those admitted under Treaties of international Copyright, and not being Books printed in a British Possession in the English Language (bound or unbound).			BOOKS, the Duties on which are not regulated by the Date of their Publication, viz.:—Books admitted under Treaties of international Copyright (conformably to Act 9 & 10 Vict., c. 58).			
Net Amount of Duty received in the United Kingdom, in the Years,	Being of Editions Printed prior to 1801.	Being of Editions Printed in or since 1801.	In the Foreign Living Languages, being of Editions Printed in or since 1801.	Works originally Produced in the United Kingdom, and republished in the Country of Export.	Works not originally Produced in the United Kingdom.	Books Printed in any British Possession, in the English Language.	TOTAL.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
1840	878 4 5	1,706 2 11	5,779 2 11	—	—	129 12 1	8,493 2 4
1841	783 9 0	1,938 18 10	5,633 10 2	—	—	95 0 8	8,450 18 8
1842	638 7 11	1,622 6 9	5,517 1 1	—	—	100 14 3	7,878 10 0
1843	802 2 2	1,692 2 6	6,432 3 6	—	—	84 14 10	9,011 3 0
1844	761 9 11	1,775 15 10	6,874 1 7	—	—	69 16 1	9,481 3 5
1845	720 12 8	2,260 11 7	7,435 19 11	—	—	75 0 1	10,492 4 3
1846	627 18 11	1,848 3 11	6,554 15 3	—	78 18 7	90 17 11	9,200 14 7
1847	722 19 11	1,162 3 7	6,444 15 7	0 1 9	415 3 7	98 5 3	8,843 9 8
1848	590 13 4	1,040 14 3	5,635 10 6	—	350 15 1	144 18 2	7,762 11 4
1849	441 13 4	803 8 3	6,024 9 10	0 3 7	400 16 0	77 13 6	7,748 4 6
1850	294 12 10	1,079 0 4	5,714 19 2	—	503 7 1	78 1 9	7,670 1 2
1851	428 6 4	1,003 19 9	7,043 14 3	0 19 6	549 3 8	66 14 4	9,092 17 10
1852	406 2 4	644 2 2	4,829 17 0	1 11 4	1,573 7 0	70 1 9	7,525 1 7
Rates of Duty chargeable per Cwt.	1 1 0	5 5 0	2 12 6	2 10 0	0 15 0	2 12 6	

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL SCOTTISH SOCIETY OF ARTS, 25th April, 1853.—Robert Ritchie, Esq., Vice-president, in the chair. The following communications were made:—1. "On a method of Communication between the Guards and Engine-Driver of the Railway Train, available also for Passengers." By the Rev. William Mitchell, Raefield, Portobello. The substantial points of this invention were the same as those adopted by the Delegates of the Associated Railway Companies, only the author proposed that the line, or cord of communication, should be within reach of the passengers. 2. "Description of a new plan of a Railway Signal, and of Communication between Engine-Driver and Guards." By Mr. Daniel Erskine, Musselburgh. In this invention an iron tube, with vulcanized India-rubber couplings extends along the carriages; the engineer and guards being provided with an air-pump, mouth-piece and alarm bell—so that either the bell may be sounded, and thus a signal be given, or the tube may be made use of as a speaking-trumpet. 3. "On Railway Inclines, and on Improvements of the Locomotive Engine, for enabling it to ascend Steep Inclines." By J. Stewart Hepburn, Esq., of Colquhalzie. The author proposed to obviate the necessity for using the present stationary engine, by fixing a spur-wheel on the axle of the driving wheel of the locomotive, which, on coming to an incline should engage in the teeth of a rack, fixed between the rails. 4. "New Designs for Iron Roofs of great clear span—with the results of calculations made with a view to compare these with the best forms at present in use." By R. H. Bow, Esq., C. E., Edinburgh. After some introductory remarks, and insisting upon the propriety of employing roofs of great clear span for large railway stations, the author instituted a comparison between the different classes of structures employed for the principals of roofs, and deduced that the triangular frame (in which the rafters constituted the main compressed member of the fabric) deserved to be preferred before all arched, compound, or other forms, when an inclined surface was demanded by the covering, of the character required for slating. And he further showed that, where untied or abutting principals could be used, rafters, when made straight and treated as bridges, formed principals of a very economical character; but that, for such a situation, rigid arched structures were quite inadmissible. He arranged those straight-raftered principals (in which the rafters were the main compressed members) into two classes: the first embracing those which were tied, or exerted only vertical pressures on the supports; and the second those which were untied, or of the abutting character. The principals of the tied class were of two kinds; in the principals of the first variety each rafter acted as a bridge, but the principals of the second partook of the nature of a framed girder. 5. "Method of Escape from a Ship in Distress, particularly for Females and Children." By Mr. A. M'Coll, Auchtermuchty. The author recommends the addition of two life belts to a slide block made to travel backwards and forwards on a stout rope fastened to the ship and the boat. Specimens of Morthan, or the Reed Mace (*Typha latifolia*), from the Black Loch, near Oban, and of the nutritious Meal obtained from it, were exhibited by Mr. Malcolm MacCallum; who considered that its fibre was suitable for textile fabrics; and that the external coating of this plant might be used in the manufacture of Paper.

Institution of Civil Engineers, May 10th, 1853. —J. M. Rendel, Esq., President, in the chair. The evening was devoted to the discussion of Mr. Coode's paper, "Description of the Chesil Bank (Portland)." It was remarked, as to the position of large shingle, that on any shelving shores, where the waves could only act upon the beach at or about the time of high water, the larger pebbles were found near the top, after the occurrence of storms, because under such circumstances only did the waves exert sufficient power to break heavily upon the beach; under light winds the force of the waves was expended in the shoal water, before reaching the beach. Instances were given of the motion of shingle, as affecting the entrances of harbours, which was the main practical point to be considered by the civil engineer. At Lowestoft, just as much sand was washed up as supplied what was required for ballasting the vessels frequenting the port. At Sunderland, the cross action of the waves, influenced by the ledge of rocks outside the new harbour, caused the deposit of shingle on the opposite sides of the groins. The work of Lamblardie on the motion of shingle was referred to, as corroborating the views of the author of the paper, on the motion of "beach" by the wind-waves, and giving valuable facts bearing on the subject. Viewing the relative position of the geological strata of the coast to the westward of Portland, it was considered probable that the extent of chalk exposed to the action of the waves had, at a former period, been much greater than at present; that the disintegration of the underlying greensand had expedited the fall of the chalk and flints, and thus supplied the material for forming the banks. The travel of pebbles was gradual, and distinctly up and down the beach, having an onward tendency in its upward motion, and yielding to the force of the then existing wind-wave. At an angle of about 45° the greatest amount of travel, or onward movement, was observed; but the size of the shingle more especially was determined by the amount of undulation.

Royal Institution, May 9th, 1853. — General Monthly Meeting, George Dodd, Esq., F.S.A., Vice-president, in the chair. John Burnett, Esq., Edward Enfield, Esq., William Charles Henry, M.D., F.R.S., Edward Holland, Esq., David Macloughlin, M.D., Charles Otter, Esq., George Taddy Tomlin, Esq., Edwin Truman, Esq., and Frederick Weber, M. D., were duly elected members. Thomas William Brande, Esq., F.R.S., L. and E., was unanimously re-elected Honorary Professor in the Royal Institution. The thanks of the members were voted to the Rev. W. Taylor, F.R.S., T. H. Huxley, Esq., F.R.S., John Conolly, M.D., W. Brockedon, Esq., F.R.S., and to Dr. Lyon Playfair, for their Lectures on April 8, 15, 22, 29, and May 6th.

PROCEEDINGS OF INSTITUTIONS.

Dunmow.—On the 5th instant, a very interesting and useful Lecture was gratuitously delivered by Dr. W. E. Humble, of London, on "Poisons," with reference, more especially, to their effects on the animal system, and the most ready means of applying remedies in cases of emergency. He commenced with some prefatory remarks on the general nature of poisons, avoiding throughout, as far as possible, the use of technical terms, and employing only such as were likely to be generally intelligible. The poisons to which special attention was directed, were those which from their general use, either in domestic economy or the arts, and various branches of industry, were liable to be mistaken for other and harmless substances; and comprised oxalic acid, lead, and its preparations; copper, and its salts; arsenic, and opium. In each case, the general characters of the poison were descanted upon; the modes of distinguishing it from substances which resemble it were shown, and the most appropriate and easy tests were exhibited for each substance; the simplest and most readily available antidotes were also pointed out, and, where possible, the mode of their preparation was explained. The numerous illustrations and experiments were highly successful, and well calculated to aid in rendering the subject more generally intelligible to a non-professional audience.

Royston.—A large audience, composed of members and friends of the Mechanics' Institute, assembled on Tuesday, the 3rd instant, to hear an address from Mrs. Chisholm, on "Emigration." J. G. Fordham, Esq., occupied the chair. Mrs. Chisholm, after giving much information which would be valuable to the emigrant, stated, that on her return to Australia, she intended to search out the husbands and fathers in Australia, of whom there were some thousands, who had left their wives and families in this country; in transmitting sums of money from these men, for the benefit of their wives, families, or aged relatives, her efforts would be fruitless, unless aided by the influential members of society in this country, who might undertake to see that the money sent be well expended. A vote of thanks was unanimously accorded to Mrs. Chisholm.

Winchester.—The close of the eighteenth lecture session of the Mechanics' Institution, was celebrated by a soirée, at St. John's-house, on Wednesday week. The chair was taken by the Rev. Charles Walters, M. A., the president. The City members, Sir J. B. East, Bart., and J. B. Carter, Esq., the Rev. F. Bugby, and the Worshipful the Mayor, also took their seats on the platform. Addresses were delivered by the gentlemen named; and the choir of the Cathedral sang several glees and songs. Mr. G. Grossmith, of London, also contributed to the amusements by recitations from the modern humourists.

MISCELLANEA.

NEWSPAPER STAMPS.—A return, obtained on the motion of Mr. Bright, has been published of the names of all the newspapers in the United Kingdom to which halfpenny stamps were issued during the year 1852. It appears from this return, that among the London daily papers, 10,000 halfpenny stamps were issued to the *Morning Herald*, and that the duty paid thereon amounted 20*l*. 16*s*. 8*d*. The same number of such stamps was issued to the *Daily News*. The *Evening Journal* had 2,000 stamps; the duty was 4*l*. 3*s*. 4*d*. The *Times* had 10,650,000 halfpenny stamps, and the duty paid amounted to 22,187*l*. 10*s*. Among the London weekly papers the *Illustrated London News* takes the lead with respect to the halfpenny stamps, for it figures in the list with 1,933,728 such stamps, at a duty of 4,028*l*. 12*s*. *Lloyd's Weekly Paper* had 132,674 halfpenny stamps; duty paid, 276*l*. 8*s*. 1*d*. *News of the World*, halfpenny stamps, 81,700; duty paid, 170*l*. 4*s*. 2*d*. *Weekly Dispatch*, halfpenny stamps, 218,852; duty paid, 455*l*. 18*s*. 10*d*. Of English provincial papers the following had to make use of the largest issues of halfpenny stamps: *Leeds Mercury*, 512,000 stamps; duty paid, 1,066*l*. 13*s*. 4*d*. *Liverpool Mercury*, 400,500 stamps; duty paid, 834*l*. 17*s*. 6*d*. *Manchester Courier*, stamps, 294,000; duty paid, 612*l*. 10*s*. *Manchester Examiner*, 432,018 stamps; duty paid, 900*l*. 0*s*. 9*d*. *Manchester Guardian*, 588,000 stamps, duty paid, 1,225*l*.—Among the Welsh papers the only one worth noting is the *Monmouthshire Merlin*, with 4,000 halfpenny stamps, for which 8*l*. 6*s*. 8*d*. duty was paid. This paper stands highest on the Welsh list, and *Yr Amersan*, a paper published in the language of the country, is lowest; it had 668 stamps, and paid duty for them to the amount of 1*l*. 7*s*. 10*d*.—In Scotland, the *North British Advertiser* had 156,600 stamps, and paid 325*l*. *North British Mail*, stamps, 43,500; duty paid, 90*l*. 12*s*. 6*d*.—And in Ireland, the *Nation* had 23,900 stamps; duty paid, 49*l*. 15*s*. 10*d*. The *Telegraph*, 22,800 stamps; duty paid, 47*l*. 10*s*.: and the *Tablet*, 16,360 stamps, on which 34*l*. 1*s*. 8*d*. was paid as duty.—*Times*.

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

Country Institutions.—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 5th May*, 1853.

191. Local Acts—Reports of the Admiralty.
311. Election Expenses—Abstract of Return.
396. Exchequer—Account.
408. Cheese—Accounts.

Delivered on 6th May.

383. Athlone Election—Minutes of Evidence.
435. Common Lodging-houses—Supplemental Report.
441. Bill—Bankruptcy (Scotland).

Delivered on 7th and 9th May.

331. Select Committees—Return.
341. Irrigation (Godavery, &c.)—Return.
358. Appeals (India)—Return.
445. Committee of Selection—Tenth Report.
275. Finance Accounts—Classes 1—8.
81 (1). Capture of Bruné—Further Return.
330. Callan Union Workhouse—Copy of Report, &c.
389. Waterford County Election—Minutes of Evidence.
420. Reigate Union—Correspondence.
421. Westmoreland Lock Hospital—Communications.
422. Newspaper Stamps—Returns.
439. Books—Return.
447. Bills—Vaccination Extension.
448. ,, —Whichwood Forest (as amended by the Select Committee).
441. ,, —Courts of Common Law (Ireland), amended in Committee, and on re-commitment.

Poor Law Board—Fifth Annual Report.
Superior Courts of Common Law, &c.—Second Report of the Commissioners.
Emigration (Australian Colonies)—Papers.

Delivered on 10th May.

191. Local Acts—Reports of the Admiralty.
377. Rye Election (Further Inquiry)—Resolutions of the Committee.
381. Maidstone Election—Report from the Committee.
385. Vessels Wrecked—Return.
394. Knaresborough Election—Report from Committee.
401. Berwick-upon-Tweed Election—Ditto.
432. National Schools (Ireland)—Regulations respecting the Sale of Books.
313. Clare Election—Copies of Inquisitions, &c. &c.

Delivered on 11th May.

437. Rajah of Sattara—Copy of Letter, &c.
442. Cathedral and Collegiate Churches—Return.
375. Leicester Election—Minutes of Evidence.
416. Rye Election—Ditto.
454. Bill—Excise Duties on Spirits.

Manning of the Royal Navy—Correspondence, &c.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 6th May, 1853.

Dated 18th March, 1853.

672. G. R. Lucas—Raising water, &c., from mines.

Dated 5th April.

809. Dr. W. W. Sleigh—Counteraction reaction motive power engine.
813. J. O'Connor—Coke from raw peat.

Dated 8th April.

845. W. F. Smith—Vessels for heating liquids.

Dated 18th April.

931. R. F. Sturges—Apparatus for vegetable or other infusions, &c.
933. W. M'Naughton—Printing yarns for carpets, and printing carpets, &c.
935. W. and F. B. Fawcett—Manufacture of carpets.
937. J. J. Gonin—Disengaging silk of gum.

Dated 19th April.

939. T. Newey—Fastenings for dress.
941. L. A. Beauvain—Machinery for obtaining wool, &c., from fabrics, and rendering them suitable for employment again.
945. C. Böhringer and G. Clemm—Soda and potash.
949. A. Blair—Propelling.

Dated 20th April.

951. S. Weight—Ventilation.
953. H. M'Evoy—Construction, &c., of door-bolts.
955. R. A. Brooman—Inhaling-tubes. (A communication.)
957. Sir W. S. Harris—Lightning-conductors for ships.

Dated 21st April.

963. J. Petrie—Steam-engines.
965. W. Robjohn—Meter for liquids.
967. W. E. Newton—Machinery for bending wood, &c. (A communication.)

Dated 22nd April.

968. T. F. Finch—Buttons.
969. J. Davis—Thrashing-machines.
970. W. Sager—Propelling.
971. W. Hunter—Cutting and planing.
972. W. and J. Asquith—Cleansing, preening, &c., wool, flocks, &c., from cards, &c.
973. W. Beard—Needles, and manufacture of the same.
974. C. M. T. du Moray—Preparing oils, and burning the same.
975. J. A. Drieu—Cutting pile of velvets, &c.

Dated 23rd April.

976. E. O. Aston and G. Germaine—Coating wood, &c., exposed to sea-water, &c.
978. T. Knowles—Machinery for picking warps.
979. F. J. Wilson—Improved wheelbarrow.
982. J. Geddes—Improvements in oars.
983. W. Johnson—Combing wool, &c. (A communication)
984. J. Napier—Separating metals from ores, &c.
985. G. F. Wilson, W. H. Hatcher, and J. Jackson—Apparatus for moulded candles.
986. R. Johnson—Apparatus for drawing wire.

Dated 25th April.

987. E. O' Connell—Method of feeding infants and invalids.
988. H. E. Hoole—Self-acting speed-regulator and safety-break.
989. C. L. Debordes—Instruments for measuring pressure and temperature of air, steam, &c.
990. J. Chatterton—Covers for wagons, &c.
991. R. Davies—Reaping-machine.
992. W. Tillie—Printing shirting fabrics.
993. J. Emery—Construction of gigs, &c.
994. W. Johnson—Retarding and stopping railway trains.
995. J. Bernard—Casting metals, &c.

Dated 26th April.

996. J. B. Sheath—Fire-arms.
997. J. E. Joffriand and R. Riviere—Washing earths containing gold.
998. G. K. Geyelin—Manufacture of white oxide of zinc.
1001. J. Pym—Building materials.
1002. A. and J. Le Roy and E. Pavy—Production of lace, &c.
1003. U. Scott—Tubular rods and rings for furniture.
1004. M. Poole—Porcelain, &c. (A communication.)

Dated 27th April.

1005. W. Johnson—Machinery for preparing, spinning, &c., cotton, &c.
1006. F. G. Underhay—Reaping and mowing machines.
1007. G. F. de Fonveille—Filtering machine.
1008. B. M. A. Langlois—Instruments to be applied to gas-burners. (A communication.)
1010. J. Hetherington and J. and E. Dugdale—Construction and application of models for casting, &c.
1012. R. Howson—Weavers' harness. (A communication.)
1013. J. H. Johnson—Apparatus for sustaining bodies in water. (A communication.)
1014. J. W. Gale—Permanent way.
1015. W. Johnson—Apparatus for marking, ruling, and ornamenting surfaces. (A communication.)
1016. G. Turner and R. Holloway—Unfermented bread, &c.
1017. G. Critchley—Regulating heat, and supply of water in heating apparatus.
1018. J. Palin and R. Sievier—Distillation, &c.
1019. S. Groves—Apparatus for pumping air.
1020. J. A. Bruce—Hay-ricks, and fastening horses, &c.
1021. T. Culpin—Steam-boilers, &c.
1022. W. Williams—Combination of materials for trays, &c.
1023. W. Reid—Testing insulation of telegraph wires.
1024. R. J. Gatlin—Distributing power.
1025. J. F. Kingston—Galvanic batteries.
1026. W. F. Thomas—Sewing or stitching machinery.

Dated 28th April.

1028. J. Hetherington—Reels.
1030. E Bird—Construction of certain vehicles.
1034. Sir J. S. Lillie—Roads, floors, &c.
1036. T. Revis—Single seed-drilling and dribbling machinery.

APPLICATION WITH COMPLETE SPECIFICATION FILED.

1009. S. Plimsoll—Cleansing, fining, &c., ale, beer, &c. 27th April, 1853.

WEEKLY LIST OF PATENTS SEALED.

Sealed 6th May, 1853.

658. John Ryall Corry and James Barrett Corry, of Queen Camel, Somerset—Invention of a new mode of sewing gloves.
668. Charles Frederick Day, of Ashford, Kent, and John Laylee, of Rye, Sussex—Improvements in sleepers and other parts of the permanent way of railroads.

Sealed 7th May.

670. Charles Troupeau, of Paris—Invention of an improved diurnal reflector.
688. George Shadforth Ogilvie, of Stapleton, near Bristol—Improvements in candlesticks and lamps.
693. William Tudor Mabley, of Manchester—Improvements in ornamenting glass, and other transparent or partially transparent substances, for windows and for other purposes.
890. Mathurin Jean Prudent Moriceau, of 39, Rue de l' Echiquier, Paris—Improvements in sharpening and dressing the cards of carding-machines and the clippers and cylinders of shearing-machines.
917. John Brannis Birch and Eugenius Birch, of Cannon-row, Parliament-street—Improvements in forming drains, and in introducing pipes or tubes into the earth.
1103. Edward Schischkar, of Halifax, York—Improvements in dyeing and colouring yarns and textile fabrics.
1104. Edward Schischkar, of Halifax, York—Improvements in colouring or staining yarns and textile fabrics.
1196. James Power, of 34, Rue de Penthièvre, Paris—Improvements in silvering all sorts of metals and glass.
59. Francis Parker, of Northampton, and William Dicks, of Leicester-Improvements in boots, shoes, and that kind of spatterdashes, termed Antigropelos.
159. Reuben Plant, of Brierly Hill, Staffordshire—Improvements in the construction of glass-house furnaces.
608. John Powis and Jabus Stanley James, of Watling-street, City—Improvements in machinery, for slotting, tenoning, morticing, grooving, drilling, boring, and vertical planing.
620. John Gilby, of Beverley, Yorkshire—Improvements in fire-arms.

Sealed 9th May.

696. John Down Gordon, of Eldon-street, Finsbury—Improvements in tuning pianofortes.

Sealed 10th May.

703. Auguste Baboneau, of Paris—Invention of an improved apparatus for melting and mixing asphalte with bitumen and other substances.
717. William Davis, of Leeds—Improvements in machinery for cutting files.

Sealed 11th May.

718. William Edward Middleton, of Birmingham—Invention of a new or improved circular-saw bench.
723. Daniel Henwood, of Charlton-street, Somers-town—Improvements in machinery for registering the number of passengers or persons entering public vehicles or vessels, theatres, bridges, or other places where it may be desirable to ascertain the number of persons entering therein.
724. Charles Seaton, of Fitzroy-street, Fitzroy-square—Improvements in the manufacture of metal tubes, and in the machinery employed therein.
732. Robert John Smith, of Islington—Improvements in machinery or apparatus for steering ships and other vessels.
801. John Trestrail, of Southampton—Improvements in raising sunken vessels or other materials from under the water or in the sea, or to prevent them from sinking.
803. James Nasmyth, of Patricroft, near Manchester—Improvements in machinery or apparatus for packing and compressing cotton, wool, and other substances.
809. William Green, of Islington—Improvements in the manufacture of textile fabrics, and in machinery or apparatus for effecting the same, parts of which improvements are also applicable to printing and embossing generally.
847. Henry Thomson, of Clitheroe—Improvements in apparatus to be used in dyeing, bleaching, and other processes in which goods are operated upon in the piece.
853. Stephen Spalding, of Hogsthorp, near Alford, Lincolnshire—Invention of an apparatus or machine for the manufacture of pantiles used in building purposes.
860. William Hall, of Nottingham—Improvements in rotary steam-engines, governors, and apparatus for supplying boilers with water, and for regulating the same.
953. Richard Archibald Brooman, of 166, Fleet-street—Improvements in the manufacture of sugar. (A communication.)
461. Asa Willard, of St. John's, New Brunswick—Improvements in machines for manufacturing butter, to be called, " A. Willard's Butter-machine."
570. Joseph John William Watson, of Old Kent-road—Improvements in illuminating apparatus, and in the production of light.
616. Francis Preston, of Manchester—Improvements in the manufacture of bobbins and spools.
651. Charles Heard Wild, of St. Martin's-lane—Improvements in fishes and fish-joints for connecting the rails of railways.
667. John Henry Johnson, of 47, Lincoln's-inn-fields, and Glasgow—Improvements in steam-engines. (A communication.)

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
May 7	3457	Self-acting Water-closet and Service-box	Stock and Son	Birmingham.
" 10	3458	An Audible Signal Apparatus, for railways, steam-vessels, and other purposes	David Salomons	3, Great Cumberland-place.